

Appendix A

References

A-1. Required Publications

Code of Federal Regulations

29 CFR 1910/29

29 CFR 1910.120 (b)

29 CFR 1926.65 (b)

40 CFR, Part 60

40 CFR 264

Department of the Army

<http://www.usace.army.mil/inet/usace-docs/>

EP 415-1-261

Quality Assurance Representative's Guide

ER 385-1-92

Safety and Occupational Health Document Requirements for HTRW Activities

ER 1110-1-263

Chemical Data Quality Management for Hazardous Waste Remedial Activities (Appendix D)

ER 1110-1-1300

Cost Engineering Policy and General Requirements

ER 1110-2-1150

Engineering and Design for Civil Works Projects

ER 1110-3-1301

Cost Engineering Policy and General Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW), Remedial Action Cost Estimates

ER 1110-345-100

Design Policy for Military Construction

ER 1110-345-700

Design Analysis

ER 1165-2-132

Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects

ER 1180-1-6

Construction Quality Management

EM 200-1-2

Technical Project Planning

EM 200-1-3

Requirements for the Preparation of Sampling and Analysis Plans

EM 385-1-1

Safety and Health Requirements

EM 1110-1-4005

In Situ Air Sparging: Engineering and Design

EM 1110-1-4007

Safety and Health Aspects of HTRW Remediation Technologies

EM 1110-1-4010

Multi-Phase Extraction: Engineering and Design.

CE-15995

Commissioning of IIVAC Systems

U.S. Environmental Protection Agency

USEPA 1986

USEPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* EPA/SW-846.

USEPA 1989a

USEPA. 1989a. *State of Technology Review - Soil Vapor Extraction Systems.* EPA/600/2-89/024. Prepared by: Hutzler, N. J., Murphy, B. E., and Gierke, J. S., of Michigan Tech University, Houghton, MI. 87 pp.

USEPA 1991c

USEPA. 1991c. *Guide for Conducting Treatability Studies Under CERCLA, Soil Vapor Extraction.* EPA/540/2-91/019A.

USEPA 1991d

USEPA. 1991d. *Soil Vapor Extraction Technology Reference Handbook.* EPA/540/2-91/003. Prepared by: Pederson, T. A., and Curtis, J. T., of Camp Dresser & McKee, Inc. Office of Research and Development.

USEPA 1992

USEPA. 1992. *A Technology Assessment of Soil Vapor Extraction and Air Sparging.* EPA/600/R-92/173. Risk Reduction Engineering Laboratory, Office of Research and Development, Cincinnati, OH. 63 pp.

USEPA 1993d

USEPA. 1993d. *Presumptive Remedies Site Characterization and Technology Selection for CERCLA Sites with VOCs in Soils.* EPA/540/F-93/048.

USEPA 1994

USEPA. 1994. *Guidance for the Data Quality Objectives Process EPA QA/G-4,* EPA/600/R-96/055. Office of Research and Development, Washington, D.C., 68 pp.

USEPA 1995

USEPA. 1995. *Guide to Documenting Cost and Performance for Remediation Projects,* EPA-542-B95-002, Member Agencies of the Federal Remediation Technologies Roundtable, March 1995. 55 pp.

USEPA 1995a

U.S. EPA. 1995ba. *Remedial Design/Remedial Action Handbook.* U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. EPA 540/R-95//059, OSWER 9355.0-04B, PB95-963307. Available from NTIS, Superfund Docket. 317 pp.

USEPA 1995b

U.S. EPA. 1995b. *How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers.* EPA 510-B-95-007. U.S. Govt. Print. Office, Washington, DC.

USEPA 1996

U.S.EPA. 1996. Assessing UST Corrective Action Technologies: *Diagnostic Evaluation of In-Situ SVE-Based System Performance*, EPA/600/R-96/041, March 1996.

USEPA 1997a

U.S. EPA, 1997. *Analysis of Selected Enhancement for Soil Vapor Extraction*. EPA-542-R-97-007. OSWER.

U.S. EPA 1997b.

U.S. EPA 1997. *How Heat Can Enhance In-situ Soil and Aquifer Remediation: Important Chemical Properties and Guidance on Choosing the Appropriate Technique*, EPA/540/S-97/502

USEPA 1998

U.S. EPA, 1998. *Steam Injection for Soil and Aquifer Remediation*, EPA/540/S-97/505

American National Standards Institute (ANSI)**A58.1**

Minimum Design Loads for Buildings and Other Structures

B31.1

Power Piping

B31-3**C80.1**

Rigid Steel Conduit, Zinc Coated

C80.5

Rigid Aluminum Conduit

ISA-S5.1

Instrumentation Symbols and Identification

MSS SP-58,-69,-89,-90American Petroleum Institute (API)**API-650**

Field Erected Tanks

EM 1110-1-4001

3 Jun 02

RP500A

Recommended Practice for Classification of Areas for Electrical Installations in Petroleum Refineries

RP500B

Recommended Practice for Classification of Areas for Electrical Installation at Drilling Rigs and Production Facilities on Land and on Fixed Marine Platforms

RP500C

Electrical Installation at Petroleum and Gas Pipeline Transportation Facilities

American Society for Testing and Materials (ASTM)

C150

Specifications for Portland Cement

D422

Methods for Particle-Size Analysis of Soils

D698

Test Method for Laboratory Compaction Characteristics of Soils Using Standard Effort

D1586

Standard Method for Penetration Test and Split-Barrel Sampling of Soils

D1587

Thin-Walled Tube Sampling of Soils

D1785

Specifications for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

D2216

Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock

D2241

Specifications for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series)

D2321

Standard Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe

D2325

Test Method for Capillary-Moisture Relationships for Coarse- and Medium-Textured Soils by Porous-Plate Apparatus

D2487

Classification of Soils for Engineering Purposes

D2488

Practice for Description and Identification of Soils (Visual-Manual Procedure)

D2850

Test Method for Unconsolidated, Undrained Strength of Cohesive Soils in Triaxial Compression

D3350

Standard Specifications for Polyethylene Plastics Pipe and Fittings Materials

D3416

Standard Test Method for Total Hydrocarbons, Methane, and Carbon Monoxide in the Atmosphere (Gas Chromatographic Method)

D5092

Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers

D5126

Guide for Comparison of Field Methods for Determining Hydraulic Conductivity in the Vadose Zone

D5314

Standard Guide for Soil Gas Monitoring in the Vadose Zone

F480

Thermoplastic Well Casing Pipe/Couplings Made in Standard Dimension Ratios (SDR) Schedule 40/80, specifications

American Water Works Association (AWWA)

A100

Water Wells

SAPC

E245

E245a

E418

E1243

Z501 Design Guide

Institute of Electrical and Electronics Engineers (IEEE)

C.2

National Electrical Safety Code

141

Recommended Practices for Electrical Power Distribution for Industrial Plants

518

The Installation of Electrical Equipment to Minimize Electrical Noise Inputs to Controllers from External Sources

National Fire Protection Association (NFPA)

30

Flammable and Combustible Liquids Code

70

National Electrical Code

496

Purged and Pressurized Enclosures for Electrical Equipment in Hazardous Locations

497

Class I Hazardous Locations for Electrical Installations in Chemical Plants

National Sanitary Foundation (NSF)

Standard 14

Plastics, Piping Components and Related Materials

Underwriters Laboratory (UL)

UL-58

Underground Tanks

UL-80

Oil Burner Fuel Tanks

UL-142

Shop Fabricated Aboveground Tanks

American Public Health Association, American Water Works Association, and Water Environment Federation (APHA/AWWA/WEF) 1998

American Public Health Association, American Water Works Association, and Water Environment Federation (APHA/AWWA/WEF). 1998. *Standard Methods for the Examination of Water and Waste Water*. 19th Edition. APHA, Washington, DC.

American Society of Mechanical Engineers (ASME).

American Society of Mechanical Engineers. *Boiler and Pressure Code*. Section VIII, Division 1.

Burdine 1953

Burdine, N. T. 1953. "Relative permeability calculations from pore size distribution data," *Journal of American Institute of Mining, Metallurgical, and Petroleum Engineers*, 198:71-7.

DePaoli et al. 1991a

DePaoli, D. W., Herbes, S. E., Wilson, J. H., Solomon, D. K., and Jennings, H. L. 1991a. *In Situ Soil Venting-Full Scale Test, Hill AFB, Guidance Document, Literature Review*. Martin-Marietta Energy Systems, Oak Ridge National Laboratory. Prepared for: Air Force Engineering & Services Center. ESL-TR-90-21 Vol. 1. Tyndall Air Force Base, FL. 65 pp.

DePaoli et al. 1991b

DePaoli, D. W., Herbes, S. E., Wilson, J. H., Solomon, D. K., and Jennings, H. L. 1991b. *In Situ Soil Venting-Full Scale Test, Hill AFB, Guidance Document*. Martin-Marietta Energy Systems, Oak Ridge National Laboratory. Prepared for: Air Force Engineering & Services Center. ESL-TR-90-21 Vol. II. Tyndall Air Force Base, FL. 219 pp.

DePaoli et al. 1991c

DePaoli, D. W., Herbes, S. E., Wilson, J. H., Solomon, D. K., and Jennings, H. L. 1991c. *In Situ Soil Venting-Full Scale Test, Hill AFB*. Martin-Marietta Energy Systems, Oak Ridge National Laboratory. Prepared for: Air Force Engineering & Services Center. ESL-TR-90-21 Vol. III. Tyndall Air Force Base, FL. 307 pp.

Downey and Hall 1994

Downey, D. C., and Hall, J. F. 1994. *Addendum One to Test Plan and Technical Protocol for a Field Treatability Test for Bioventing: Using Soil Gas Surveys to Determine Bioventing Feasibility and Natural Attenuation Potential*. U.S. Air Force Center for Environmental Excellence (AFCEE), Brooks Air Force Base, TX. 23 pp.

Hinchee et al. 1992

Hinchee, R. E., Ong, S. K., Miller, R. N., Downey, D. C., and Frandt, R. 1992. *Test Plan and Technical Protocol for a Field Treatability Test for Bioventing*, U.S. Air Force Center for Environmental Excellence (AFCEE), Brooks Air Force Base, TX. 78 pp.

Holbrook et al. 1998

Holbrook, T.B., Bass, D., Boersma, P., DiGiulio, D.C., Eisenbeis, J., Hutzler, N.J., Roberts, E. 1998 *Vapor Extraction and Air Sparging Design and Application*. WASTECH Innovative Site Remediation Technology Series, Vol. 7. W.C. Anderson (ed.), American Academy of Environmental Engineers, Annapolis, MD.

Johnson et al. 1994

Johnson, P. C., Baehr, A., Brown, R. A., Hinchee, R., and Hoag, G. 1994. *Vacuum Vapor Extraction*. WASTECH Innovative Site Remediation Technology Series, Vol. 8. W.C. Anderson (ed.), American Academy of Environmental Engineers, Annapolis, MD. 224 pp.

Johnson and Ettinger 1994

Johnson, P. C., and Ettinger, R. A. 1994. Considerations for the design of in situ vapor extraction systems: Radius of influence vs. zone of remediation. *Ground Water Monitoring Review*. Summer: 123-128.

Johnson et al. 1990a

Johnson, P. C., Stanley, C. C., Kembowski, M. W., Byers, D. L., and Colhart, J. D. 1990a. A practical approach to the design, operation, and monitoring of in situ soil-venting systems. *Ground Water Monitoring Review*. 10(2):159-78.

Kahn, L. 1988

Kahn, L. 1988. *Determination of Total Organic Carbon in Sediment*. USEPA Region II, Edison, NJ.

Leeson and Hinchee 1995

Leeson, A., and Hinchee, R.E. 1995. *Principles and Practices of Bioventing*. Vols. I and II. Prepared by Battelle Memorial Institute, Columbus, OH for Environics Directorate, Armstrong Laboratory, Tyndall AFB, FL; National Risk Management Research Laboratory, USEPA, Cincinnati, OH; and, US Air Force Center for Environmental Excellence, Technology Transfer Division, Brooks AFB, TX.

Leif, et al., 1998

Leif, R.N., M. Chiarappa, R. D. Aines, R.L. Newmark, K.G. Knauss, and C. Eaker, In-situ Hydrothermal Oxidative Destruction of DNAPLs in a Creosote Contaminated Site, in Wickramanayake, G.B., and R.E. Hinchee (eds.), *Physical, Chemical, and Thermal Technologies: Remediation of Chlorinated and Recalcitrant Compounds*. Battelle Press, Columbus, OH, 511 p.

Massmann 1989

Massmann, J. W. 1989. Applying groundwater flow models in vapor extraction system design. *Journal of Environmental Engineering ASCE* 115(1): 129-49.

Shan, Falta, and Javandel 1992

Shan, C., Falta, R., and Javandel, I. 1992. Analytical solutions for steady state gas flow to a soil vapor extraction well. *Water Resources Research* 28(4): 1105-20.

Ward et al. 1995

Ward, C. H., Loehr, R. C., Nyer, E. K., Piotrowski, M. R., Thomas, J. M., Spain, J. C., Wilson, J. T., and Norris, R. D. 1995. *Bioremediation*. WASTECH Innovative Site Remediation Technology Series, Vol. 1. W.C. Anderson (ed.), American Academy of Environmental Engineers, Annapolis, MD. 288 pp.

A-2. Related Publications**ABB Environmental Services, Inc. 1990**

ABB Environmental Services, Inc. 1990. *Compilation of Data on the Composition, Physical Characteristics and Water Solubility of Fuel Products*. Prepared for: Massachusetts Department of Environmental Protection (MADEP). Job No. 6042-04. pp. 1-3.

Air Force Center for Environmental Excellence (AFCEE) 1994a

Air Force Center for Environmental Excellence (AFCEE). 1994a. *Bioventing Performance and Cost Summary*. Brooks Air Force Base, TX. 14 pp.

AFCEE 1996

Air Force Center for Environmental Excellence (AFCEE). 1996. *Bioventing Performance And Cost Results From Multiple Air Force Test Sites*. Technology Demonstration Final Tech. Memo. Technology Transfer Div., Brooks Air Force Base, TX.

AFCEE 1999

Air Force Center for Environmental Excellence (AFCEE) 1999. *Draft Final Remedial Process Optimization Handbook*, AFCEE, Brooks AFB, TX

AFCEE 1994b

Air Force Center for Environmental Excellence (AFCEE) 1994b. *Technology Profile: Vacuum-Mediated LNAPL Free Product Recovery/Bioremediation (Bioslurper)*. Issue 1. March 1994. Brook Air Force Base, TX. 2 pp.

Adams, Smith, and Basile 1992

Adams, T. V., Smith, G., and Basile, A. 1992. *Evaluating DNAPL Removal in a Low Permeability Porous Media Using Steam Enhanced Vapor and Groundwater Extraction*. Patent Pending, References N. 92-09-G023.

Alley and Associates Inc. 1998

Alley E. Roberts, Stevens, Lem B., and Cleland William L. 1998. *Air Quality Control Handbook*. McGraw Hill. New York, NY.

Alvarez-Cohen et al. 1992

Alvarez-Cohen, L., McCarty, P. L., Boulygina, E., Hanson, R. S., Brusseau, G. A., and Tsien, H. C. 1992. Characterization of a methane-utilizing bacterium from a bacterial consortium that rapidly degrades trichloroethylene and chloroform. *Applied and Environmental Microbiology*. 58:1886-93.

American Petroleum Institute (API) 1980a

API. 1980a. *Examination of Venting for Removal of Gasoline Vapors from Contaminated Soil.* API Publication No. 4429.

API 1980b

API. 1980b. *Venting Study - Final Report.* API Publication No. 4429.

API 1981

API. 1981. *Standard Definitions for Petroleum Statistics.* Technical Report No. 1, 3rd ed., Washington, DC.

Armstrong et al. 1994

Armstrong, J.E., Frind, E.O., and McClellan, R.D. 1994. Nonequilibrium mass transfer between the vapor, aqueous, and solid phases in unsaturated soils during soil vapor extraction. *Water Resour. Res.* 30(2):355-368.

Arthur D. Little, Inc. 1981

Arthur D. Little, Inc. 1981. *Reference Constants for Priority Pollutants and Selected Chemicals.* Reference No. 84204.

Arthur D. Little, Inc. 1987

Arthur D. Little, Inc. 1987. *The Installation Restoration Program Toxicology Guide, Volume 1.* Section 2:1-16.

Athey and Wrenn 1993

Athey, P., and Wrenn, S. 1993. Bioremediation of diesel fuel contaminated soil using an onsite treatment cell in Anchorage, Alaska. In: Kostecki, P. T., Calabrese, E. J., and Barkan, C. P. L. (eds.). *Principles and Practices for Diesel Contaminated Soils, Volume II.* Association for the Environmental Health of Soils, Amherst, MA. pp. 1-10.

Aurelius and Brown 1987

Aurelius, M. W., and Brown, K. W. 1987. Fate of spilled xylene as influenced by soil moisture content. *Water, Air, and Soil Pollution.* 36:23-31.

Baehr and Corapcioglu 1987

Baehr, A. L., and Corapcioglu, M. Y. 1987. A compositional multiphased model for groundwater contamination by petroleum products. I. Numerical solution. *Water Resources Research.* 23:201-13.

Baehr, Hoag, and Marley 1989

Baehr, A. L., Hoag, G. E., and Marley, M. C. 1989. Removing volatile contaminants from the unsaturated zone by inducing advective air-phase transport. *Journal of Contaminant Hydrology*. 4:1-26.

Baker 1995

Baker, R. S. 1995. One-, two-, and three-phase flow during free-product recovery. In R.E. Hinchee, J.A. Kittel, and H.J. Reisinger (eds.) *Applied Bioremediation of Petroleum Hydrocarbons*. Battelle Press, Columbus, OH. Pp. 349-359.

Baker and Becker 1995

Baker, R. S., and Becker, D. J. 1995. Introducing USACE's Soil Vapor Extraction and Bioventing Engineer Manual. *Proceedings of HMCRI Federal Environmental Restoration IV and Defense Cleanup Southeast Conference*, March 14-15, 1995, Atlanta, GA. Hazardous Materials Control Resources Institute, Rockville, MD. 9 pp.

Baker and Bierschenk 1995

Baker, R. S., and Bierschenk, J. 1995. Vacuum-enhanced recovery of water and NAPL: concept and field test. *Journal of Soil Contamination*. 4(1): 57-76.

Baker and Groher, 1998

Baker, R.S., and Groher, D.M. 1998. Does multiphase extraction require soil desaturation to remediate chlorinated sites? pp. 175-180. In: Wickramanayake, G.B., and Hinchee, R.B. (Eds.) *Physical, Chemical and Thermal Technologies: Remediation of Chlorinated and Recalcitrant Compounds*. Battelle Press, Columbus, OH.

Baker, R.S. 1999.

Bioventing systems: A critical review. pp. 595-630. In: Adriana, D.C., Bollag, J.M., Frankenberger, W.T., and Sims, R.C. (eds.) *Bioremediation of Contaminated Soils*. Amer. Soc. Agron., Crop Sci. Soc. Amer., Soil Sci. Soc. Amer. Agronomy Monograph no. 37. Madison, WI 53711, USA.

Baker and Wiseman 1992

Baker, R. S., and Wiseman, J. T. 1992. Importance of vadose zone monitoring during soil vapor extraction pilot studies. *Proceedings: International Symposium on In Situ Treatment of Contaminated Soil and Water*. Cincinnati, OH. February 3-6, 1992. Air and Waste Management Association, pp. 26-41.

Baker et al. 1994a

Baker, R. S., Ghaemghami, J., Simkins, S., and Mallory, L. M. 1994a. A vadose column treatability test for bioventing applications. In: Hinchee, R. E., Alleman, B. C., Hoeppel, R. E., and Miller, R. N. (eds.). *Hydrocarbon Bioremediation*. Lewis Publishers, Boca Raton, FL. pp. 32-39.

Baker et al. 1994b

Baker, R. S., Ghaemghami, J., Simkins, S., and Mallory, L. M. 1994b. Demonstrating the efficacy of bioventing using radiotracers. In Gee, G. W., and Wing, N. R. (eds.) *Proceedings: Thirty-Third Hanford Symposium on Health and the Environment, "In Situ Remediation: Scientific Basis for Current and Future Technologies,"* Pasco, WA. Nov. 7-11, 1994. Battelle Press, Columbus, OH pp. 259-277.

Baker, Hayes, and Frisbie 1995

Baker, R. S., Hayes, M. E., and Frisbie, S. H. 1995. Evidence of preferential vapor flow during in situ air sparging. In: Hinchee, R.E., R.N Miller, and P.C. Johnson (eds.) *In Situ Aeration: Air Sparging, Bioventing, and Related Remediation Processes*. Battelle Press, Columbus, OH. pp. 63-73.

Ball and Wolf 1990

Ball, R., and Wolf, S. 1990. Design considerations for soil cleanup by soil vapor extraction. *Environmental Progress*. 9(3):187-90.

Batchelder, Panzeri, and Phillips 1986

Batchelder, G. V., Panzeri, W. A., and Phillips, H. T. 1986. Soil ventilation for the removal of adsorbed liquid hydrocarbons in the subsurface. *Proceedings: Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. November 12-14, 1986. NGWA/API, Dublin, OH.

Battaglia and Morgan 1994

Battaglia, A., and Morgan, D. J. 1994. Ex-situ forced aeration of soil piles: a physical model. *Environmental Progress*. 13(8): 178-87.

Bear 1979

Bear, J. 1979. *Hydraulics of Groundwater*. McGraw-Hill, Inc., New York, NY.

Beckett and Huntley 1994

Beckett, G. D., and Huntley, D. 1994. Characterization of flow parameters controlling soil vapor extraction. *Groundwater*. 32:239-47.

Bennedsen, Scott, and Hartley 1987

Bennedsen, M. B., Scott, J. P., and Hartley, J. D. 1987. Use of vapor extraction systems for in situ removal of volatile organic compounds from soil. *Proceedings: National Conference on Hazardous Wastes and Hazardous Materials*. Hazardous Materials Control Research Institute, Washington, DC. pp. 92-5.

Bentley and Travis 1991

Bentley, H. W., and Travis, B. 1991. Modeling in-situ biodegradation in unsaturated and saturated soils. *Proceedings of the Symposium on Soil Venting*. Houston, TX. April 29-May 1, 1993. EPA/600/R-92/174. USEPA Office of Research and Development, Washington DC. pp. 141-63.

Blake and Gates 1986

Blake, S. B., and Gates, M. M. 1986. Vacuum enhanced hydrocarbon recovery: a case study. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. November 1986. NGWA/API, Dublin, OH. pp. 709-21.

Bouwer 1988

Bouwer, H. 1988. The Bouwer and Rice slug test - an update. *Groundwater*. 27(3): 304-09.

Bouwer and Rice 1976

Bouwer, H., and Rice, R. C. 1976. A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells. *Water Resources Research.* 12(3): 423-28.

Brailey and Rog 1989

Brailey, D. E., and Rog, S. R. 1989. Rate-limited vapor extraction of dissolved/adsorbed gasoline constituents: Soldotna, Alaska. *Proceedings: Ground Water: Alaska's Hidden Resource.* American Water Resources Association. Alaska Ground Water Association. Water Research Center, Institute of Northern Engineering, University of Alaska Fairbanks. Report IWR-112.

Brailey et al. 1995

Brailey, D. E., King, P. T., Munic, J., and Clippard, J. 1995. A streamtube approach for design of multiple vent systems. *Abstracts of Third International Symposium on In Situ and On-Site Bioreclamation.* April 24-27, 1995, San Diego, CA. Battelle, Columbus, OH.

Breckenridge, Williams, and Keck 1991

Breckenridge, R. P., Williams, J. R., and Keck, J. F. 1991. *Characterizing Soils for Hazardous Waste Site Assessments.* Ground-Water Issue, EPA/540/4-91/003, Office of Research and Development, Office of Solid Waste and Emergency Response.

Brooks and Corey 1964

Brooks, R. H., and Corey, A. T. 1964. Hydraulic properties of porous media. *Hydrology Papers No. 3.* Colorado State University., Ft. Collins, CO. 29 pp.

Brooks and Corey 1966

Brooks, R. H., and Corey, A. T. 1966. Properties of porous media affecting fluid flow. *Journal Irrigation and Drainage Division ASCE.* 92:61-88.

Brown 1992

Brown, R. A. 1992. The advantages and disadvantages of bioventing and soil vapor extraction technology. *Bioventing and Vapor Extraction: Uses and Applications in Remediation Operations, Proceedings of a Live Satellite Seminar.* Air & Waste Management Association and HWAC. April 15, 1992. pp. 77-101.

Brown and Fraxedas 1991

Brown, R. A., and Fraxedas, R. 1991. Air sparging - extending volatilization to contaminated aquifers. *Proceedings: Symposium on Soil Venting.* EPA/600/R-92/174. Houston, TX. April 29-May 1, 1991.

Brusseau 1991

Brusseau, M.L. 1991. Transport of organic chemicals by gas advection in structured or heterogeneous porous media: development of a model and application to column experiments. *Water Resources Research.* 27(12): 3189-3199.

Brusseau 1996

Brusseau, M.F. 1996. Evaluation of simple methods for estimating contaminant removal by flushing. *Ground Water.* 4(1):19-22.

Buck and Seider 1991/1992

Buck, F. A. M., and Seider, E. L. 1991/1992. State-of-the-art VOC abatement from soil-venting operations. *Remediation Journal of Environment Cleanup Cost, Technologies and Techniques*. 2(1):39-50.

Buck 2000

Buck, F. A. M. 2000. *Test for Chlorinated Dioxins/Furans in Effluent Vapor from a Catalytic Oxidizer whose Feed Streams contained both Chlorinated and Petroleum VOCs*, presented at the Tenth Annual West Coast Conference by AEHS and US. Navy on Contaminated Soils and Water -Innovative Technologies Session, March 20-23, 2000.

Buscheck and Peargin 1991

Buscheck, T., and Peargin, T. R. 1991. Summary of a nation-wide vapor extraction system performance study. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. November 1991. NGWA/API, Dublin, OH. pp. 205-19.

Camp Dresser & McKee Inc. (CDM) 1986

Camp Dresser & McKee Inc. (CDM). 1986. *Interim Report for Field Evaluation of Terra Vac Corrective Action Technology at a Florida LUST Site*. Contract No. 68-03-3409. USEPA Office of Research and Development.

Cassel and Klute 1986

Cassel, D. K., and Klute, A. 1986. Water potential: tensiometry. In: Klute, A. (Ed.). *Methods of Soil Analysis, Part I - Physical and Mineralogical Methods*. Agronomy Monograph No. 9 (2nd Ed.). American Society of Agronomy - Soil Science Society of America, Madison, WI. pp. 563-96.

Cassel and Nielsen 1986

Cassel, D. K., and Nielsen, D. R. 1986. Field capacity and available water capacity. In: A. Klute (ed.) *Methods of Soil Analysis, Part 1. Physical and Mineralogical Methods* - Agronomy Monograph No. 9 (2nd Edition). American Soc. of Agronomy - Soil Science Soc. of America, Madison, WI. pp. 901-926.

Cho et al. 1997

Cho, J.S., D.C. DiGiulio, and J.T. Wilson. 1997. In-situ air injection, soil vacuum extraction and enhanced biodegradation: A case study in a JP-4 jet fuel contaminated site. *Environmental Progress*. 16(1):35-42.

Cho and DiGiulio 1992

Cho, J.S. and DiGiulio, D.C., 1992. Pneumatic Pumping Test for Soil Vacuum Extraction. *Environmental Progress*. 11(3). pp. 228-223.

Churcher and Dickhout 1989

Churcher, P. L., and Dickhout, R. D. 1989. Analysis of ancient sediments for total organic carbon - some new ideas. *Journal of Geochemical Exploration*. 29: 235-46.

CONCAWE 1985

CONCAWE. 1985. Health aspects of petroleum fuels: Potential hazards and precautions for individual classes of fuels. Report No. 85/81. The Hague. pp. 16-35.

Conner 1988

Conner, R. J. 1988. Case study on soil venting. *Pollution Engineering*. 20(8):74-8.

Cooper and Jacob 1946

Cooper, H. H., Jr., and Jacob, C. E. 1946. A generalized graphical method for evaluating formation constants and summarizing well field history. *Transactional American Geophysical Union*. 27:526-34.

Corapcioglu and Baehr 1987

Corapcioglu, M. Y., and Baehr, A. L. 1987. A compositional multiphased model for groundwater contamination by petroleum products. I. Theoretical consideration. *Water Resources Research*. 23:191-200.

Corbitt 1990

Corbitt, R. A. 1990. *Standard Handbook of Environmental Engineering*. McGraw-Hill Publishing Co., Inc. New York, NY. 423 pp.

Corey 1986a

Corey, A. T. 1986a. Air permeability. In: Klute, A. (Ed.). *Methods of Soil Analysis, Part 1 - Physical and Mineralogical Methods*. Agronomy Monograph No. 9 (2nd Ed.). American Society of Agronomy-Soil Science Society of America, Madison, WI. pp. 1121-36.

Corey 1986b

Corey, A. T. 1986b. *Mechanics of Immiscible Fluids in Porous Media*. Water Resources Publications, Littleton, CO.

Crow, Anderson, and Minugh 1986

Crow, W. L., Anderson, E. P., and Minugh, E. M. 1986. Subsurface venting of vapors emanating from hydrocarbon product on ground water. *Ground Water Monitoring Review*. 7(1):51-7.

Danko 1989

Danko, J. 1989. Applicability and limitations of soil vapor extraction. In: USEPA 1991. *Soil Vapor Extraction Technology Reference Handbook*. Appendix B.

Davies 1989

Davies, S. H. 1989. The influence of soil characteristics on the sorption of organic vapors. *The Workshop on Soil Vacuum Extraction*. R.S. Kerr Environmental Research Laboratory, Ada, OK. April 27-28, 1989.

DePaoli, Herbes, and Elliott 1989

DePaoli, D. W., Herbes, S. E., and Elliott, M. G. 1989. Performance of in situ soil venting systems at jet fuel spill sites. In: USEPA 1991. *Soil Vapor Extraction Technology Reference Handbook*. Appendix H.

DiGiulio 1992

DiGiulio, D. 1992. Memorandum prepared for Region VII USEPA dated April 20, 1992. Robert S. Kerr Environmental Research Laboratory, Ada, OK.

DiGiulio et al. 1990

DiGiulio, D. C., Cho, J. S., Dupont, R. R., and Kemblowski, M. W. 1990. Conducting field tests for evaluation of soil vacuum extraction application. *Proceedings: Fourth National Outdoor Action Conference*. NWWA, Dublin, OH. pp. 587-601.

DiGiulio et al. 1998

DiGiulio, D.C., Brusseau, M.L., and Ravi, V. 1998. Use of Diffusion Modeling to Aid Assessment of Rate-Limited Vapor Transport for SVE. *Physical, Chemical, and Thermal Technologies: Remediation of Chlorinated and Recalcitrant Compounds*, Vol. 1(5), Wickramanayake, G.B., Hinchee, R.E. (eds.), Battelle Press, Columbus, OH. pp. 155-160.

DiGiulio and Ravi 1999

DiGiulio, D.C., and Ravi, V. 1999. Radius of influence measurement vs. pore-velocity calculation for soil venting design. Draft undergoing revision.

DiGiulio et al. 1999

DiGiulio, D.C., Ravi, V., and Brusseau, M.L. 1999. Evaluation of mass flux to and from ground water using a vertical flux model (VFLUX): Application to the soil vacuum extraction closure problem. *Ground Water Monitoring and Remediation*. Spring:96-104.

Dineen et al. 1990

Dineen, D., Slater, J. P., Hicks, P., Holland, J., and Clendening, L. D. 1990. In situ biological remediation of petroleum hydrocarbons in unsaturated soils. n: Kostecki, P.T., and Calabrese, E. J. (eds). *Petroleum Contaminated Soils Vol. 3*. Lewis Publishers, Chelsea, MI. pp. 177-86.

Downey 1995

Downey, Doug. 1995. *Bioventing Offers Low-Cost Option for Treatment of Contaminated Soil*. Hazardous Waste News. p. 347. October 30, 1995.

Dragun 1988

Dragun, J. 1988. *The Soil Chemistry of Hazardous Materials*. Hazardous Materials Control Research Institute, Silver Springs, MD. 458 pp.

Driscoll 1986

Driscoll, F. G. 1986. *Groundwater and Wells*. Johnson Filtration Systems, Inc., St. Paul, MN. 7 pp.

Dukek 1978

Dukek, W. G. 1978. Aviation and other gas turbine fuels. In: Grayson, M. (ed). *Kirk-Othmer Encyclopedia of Chemical Technology*, 3rd Ed. Vol. 3. John Wiley & Sons, New York, NY. pp. 328-57.

Dullien 1979

Dullien, F. A. 1979. *Porous Media: Fluid Transport and Pore Structure*. Academic Press. New York, NY. pp. 200-9.

Dupont, Doucette, and Hinchee 1991

Dupont, R. R., Doucette, W. J., and Hinchee, R. E. 1991. Assessment of in situ bioremediation potential and the application of bioventing at a fuel-contaminated site. In: Hinchee, R. E., and Olfenbuttel, R. F. (eds.). *In Situ Bioreclamation*. Butterworth-Heinemann, Boston, MA. pp. 262-82.

Emcon Associates 1980

Emcon Associates. 1980. *Methane Generation and Recovery from Landfills*. Ann Arbor, MI. pp. 1-48.

Enviresponse, Inc. 1987

Enviresponse, Inc. 1987. *Demonstration Test Plan, In-Situ Vacuum Extraction Technology*. Terra Vac Inc., SITE Program, Groveland Wells Superfund Site, Groveland, MA.

ETG Environmental Inc. Data 1994

ETG Environmental Inc. Data. 1994. Personal Communication with Dr. Fred Payne. 31 March 1994 to 8 April 1994.

Evans 1991

Evans, G. M. 1991. USEPA SITE demonstration of AWD technologies Aqua-Detox/SVE system. *Journal of the Air and Waste Management Association*. 41(11): 1519-23.

Falta, Pruess, and Chesnut 1993

Falta, R. W., Pruess, K., and Chesnut, D. A. 1993. Modeling advective contaminant transport during soil vapor extraction. *Groundwater*. 31(6):1011-20.

Falta 1996

Falta, R. W., A Program for Analyzing Transient and Steady-State Soil Gas Pump Tests, *Ground Water*, Vol 34, No 4, July-August, 1996, pp. 750-755

Farmer et al. 1980

Farmer, W. J., Yang, M. S., Letey, J., and Spencer, W. F. 1980. *Land Disposal of Hexachlorobenzene Wastes: Controlling Vapor Movement in Soil*. EPA/600/2-80/119. USEPA Office of Research and Development.

Feenstra, Mackay, and Cherry 1991

Feenstra, S., Mackay, D. M., and Cherry, J. A. 1991. A method for assessing residual NAPL based on organic chemical concentrations in soil samples. *Groundwater Monitoring Review*. 11:128-36.

Flatman et al. 1984

Flatman, G., et al. 1984. Geostatistical strategy for soil sampling: the survey and the census. *Environmental Monitoring and Assessment*. 4: 335-49.

Freeze and Cherry 1979

Freeze, R. A., and Cherry, J. A. 1979. *Groundwater*. Prentice Hall, Englewood Cliffs, NJ. 604 pp.

Gardner 1986

Gardner, W. H. 1986. Water content. In: Klute, A. (Ed.). *Methods of Soil Analysis, Part 1 - Physical and Mineralogical Methods*. Agronomy Monograph No. 9. (2nd Ed.). American Society of Agronomy-Soil Science Society of America, Madison, WI. pp. 493-544.

Gauglitz et al. 1994a

Gauglitz, P. A., Bergsman, T. M., Caley, S. M., Heath, W. O., Miller, M. C., Moss, R. W., Roberts, J. S., Shalla, R., Schlender, M. H., Jarosch, T. R., Eddy-Dilek, C. A., and Looney, B. B. 1994a. *Six-Phase Soil Heating for Enhanced Removal of Contaminants: Volatile Organic Compounds in Non-Arid Soils Integrated Demonstration, Savannah River Site*. Prepared for the Office of Technology Development, U.S. Department of Energy. PNL-10184, US-406. Battelle Pacific Northwest Laboratory, Richland, WA. 69 pp.

Gauglitz et al. 1994b

Gauglitz, P. A., Roberts, J. S., Bergsman, T. M., Caley, S. M., Heath, W. O., Miller, M. C., Moss, R. W., Shalla, R., Jarosch, T. R., Eddy-Dilek, C. A., and Looney, B. B. 1994b. Six-phase soil heating accelerates VOC extraction from clay soil. *Proc. SPECTRUM '94: International Nuclear and Hazardous Waste Management*. Atlanta, GA., August 14-18, 1994. American Nuclear Society, La Grange Park, Illinois, pp. 2081-9.

Gierke et al. 1992

Gierke, J.S., Hutzler, N.J., and McKenzie, D.B. 1992. Vapor transport in unsaturated soil columns: Implications for vapor extraction. *Water Resour. Res.* 28(2): 323-335.

Gillham and Cherry 1982

Gillham, R. W., and Cherry, J. A. 1982. *Contaminant Migration in Saturated Unconsolidated Geologic Deposits*. Geological Society of America Special Paper No. 189. Boulder, CO. pp. 31-62.

Govind et al. 1994

Govind, R., Utgikar, V., Zhao, W., Shan, Y., and Parvatiyar, M. 1994. Development of novel biofilters for treatment of volatile organic compounds. *Proceedings: IGT Symposium on Gas, Oil, and Environmental Technology*. Colorado Springs, CO. November 29-December 3, 1993. Institute of Gas Technology, Chicago, IL.

Griffioen et al., 1998

Griffioen, J.W., Barry, D.A., and Parlange, J.-Y. 1998. Interpretation of two-region model parameters. *Water Resources Research*. 34(3): 373-384.

Guard et al. 1983

Guard, H. E., et al. 1983. *Characterization of Gasolines, Diesel Fuels, and Their Water Soluble Fractions*. Naval Biosciences Laboratory, Naval Supply Center, Oakland, CA.

Hantush and Jacob 1955

Hantush, M.S. and Jacob, C.E. 1955. Nonsteady radial flow in an infinite leaky aquifer. *Trans. Amer. Geophys. Union.* 36. pp. 95-100.

Hassett and Banwart 1989

Hassett, J. J., and Banwart, W. L. 1989. The sorption of nonpolar organics by soils and sediments. In: Sawhney, B. L., and Brown, K. (Eds.) *Reactions and Movement of Organic Chemicals in Soils*. Soil Science Society of America and American Society of Agronomy, Madison, WI. pp. 31-44.

Hayes, Henry, and Testa 1989

Hayes, D., Henry, E. C., and Testa, S. M. 1989. A practical approach to shallow petroleum hydrocarbon recovery. *Ground Water Monitoring Review.* 9(1):180-85.

Hazen et al. 1994

Hazen, T., Fliermans, C., Enzien, M., Dougherty, J., and Lombard, K. 1994. In situ methanotrophic bioremediation using horizontal well technology. *Proceedings: IGT Symposium on Gas, Oil, and Environmental Technology.* Colorado Springs, CO. November 29-December 3, 1993. Institute of Gas Technology, Chicago, IL.

Heath et al. 1993

Heath, J. S., Koblis, K., Sager, S. L., and Day, C. 1993. Risk assessment for total petroleum hydrocarbons. In: Calabrese, E. J., and Kostecki, P. T. (eds.). *Hydrocarbon Contaminated Soils - Volume III*. Lewis Publishers, Chelsea, MI. pp. 267-301.

Heath and Truex 1994

Heath, W. O., and Truex, M. J. 1994. Enhanced in-situ bioremediation using six-phase electrical heating. In: Gee, G. W., and Wing, N. R. (eds.) 33rd Hanford Symp. on Health and the Environment, *In Situ Remediation: Scientific Basis for Current and Future Technologies*, Pasco, WA, Nov. 7-11, 1994. Battelle Press, Columbus, OH. pp. 781-797.

Hewitt et al. 1992

Hewitt, A. D., Miyares, P. H., Leggett, D. C., and Jenkins, T. F. 1992. Aqueous extraction-headspace/gas chromatographic method for determination of volatile organic compounds in soils. *U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory Report 92-6.*

Hillel 1980a

Hillel, D. 1980a. *Fundamentals of Soil Physics*. Academic Press, New York, 413 pp.

Hillel 1980b

Hillel, D. 1980b. *Applications of Soil Physics*. Academic Press, New York, 385 pp.

Hiller 1991

Hiller, D. H. 1991. Performance characteristics of vapor extraction systems operated in Europe. *Proceedings: Symposium on Soil Venting.* EPA/600/R-92/174. Houston, TX. April 29-May 1, 1991. USEPA Office of Research and Development, Washington, DC. pp. 193-202.

Hinchee 1994

Hinchee, R. E. 1994. Air sparging state of the art. In: Hinchee, R. E. (ed). *Air Sparging for Site Remediation*. Lewis Publishers, Boca Raton, FL. pp. 1-13.

Hinchee, Arthur, and Miller 1991a

Hinchee, R. E., Arthur, M. F., and Miller, R. N. 1991a. Bioventing for in-situ remediation of jet fuel. *Proceedings: Air Force Environmental Restoration Technology Symposium*. San Antonio, TX.

Hinchee and Ong 1992

Hinchee, R. E., and Ong, S. K. 1992. A rapid in situ respiration test for measuring aerobic biodegradation rates of hydrocarbons in soil. *J. Air Waste Manage. Assoc.* 42:1309.

Hinchee, Ong, and Hoeppel 1991b

Hinchee, R. E., Ong, S. K., and Hoeppel, R. 1991b. A field treatability test for bioventing. *Proceedings: 84th Annual Meeting and Exhibition of the Air and Waste Management Association*. Paper 91-19.4. Vancouver, BC. 13 pp.

Hoag 1991

Hoag, G. E. 1991. Soil vapor extraction research developments. In: Pederson, T. A., and Curtis, J. T. (eds.). *Soil Vapor Extraction Technology Reference Handbook*. EPA/540/2-91-003. Office of Research and Development.

Hoag and Cliff 1985

Hoag, G. E., and Cliff, B. 1985. The use of the soil venting technique for the remediation of petroleum contaminated soils. In: Calabrese, E. J., and Kostecki, P. T. (eds). *Soils Contaminated by Petroleum: Environmental and Public Health Effects*. John Wiley & Sons, New York.

Hoag and Marley 1986

Hoag, G. E., and Marley, M. C. 1986. Gasoline residual saturation in unsaturated uniform aquifer materials. *Journal of Environmental Engineering*. 112(3):586-604.

Hoeppel, Hinchee, and Arthur 1990

Hoeppel, R. E., Hinchee, R. E., and Arthur, M. F. 1990. Bioventing soils contaminated with petroleum hydrocarbons. *Journal of Industrial Microbiology*. 8:141.

Hoeppel et al. 1995

Hoeppel, R. E., Kittel, J. A., Goetz, F. E., Hinchee, R. E., and Abbott, J. E. 1995. Bioslurping technology applications at naval middle distillate fuel remediation sites. In R.E. Hinchee, J.A. Kittel, and H.J. Reisinger (eds.) *Applied Bioremediation of Petroleum Hydrocarbons*. Battelle Press, Columbus, OH. pp. 389-400.

Houston, Kreamer, and Marwig 1989

Houston, S. L., Kreamer, D. K., and Marwig, R. 1989. A batch-type testing method for determination of adsorption of gaseous compounds on partially saturated soils. *Journal of Testing and Evaluation*. ASTM. 12(1): 3-10.

Howe, Mullins, and Rogers 1986

Howe, G. B., Mullins, M. E., and Rogers, T. N. 1986. *Evaluation and Prediction of Henry's Law Constants and Aqueous Solubilities for Solvents and Hydrocarbon Fuel Components, Volume I: Technical Discussion*. USAFESC Report No. ESL-86-66. U.S. Air Force Engineering and Services Center, Tyndall AFB, FL. 86 pp.

Installation Restoration Program (IRP) 1987

Installation Restoration Program (IRP). 1987. *The Installation Restoration Program Toxicology Guide. Vol. 3*. Arthur D. Little. Cambridge, MA.

IT Corporation 1993

IT Corporation. 1993. *Draft Evaluation of Mathematical Models for Remediation of Leaking UST Sites*: IT Corporation, Cincinnati, OH.

Johnson et al. 1993

Johnson, R. L., Johnson, P. C., McWhorter, D. B., Hinchee, R. E., and Goodman, I. 1993. FOCUS: An overview of in situ air sparging. *Groundwater Monitoring Review*. 13(4):127-35.

Johnson et al. 1994

Johnson, R., Grady, D., Walden, T., and Hopkins, H. 1994. Remediation of tight soils using air flushing: field experiments at Sarnia, Ontario. *Proc. Fourth Annual Symp. On Groundwater and Soil Remediation*. Calgary, Alberta, Sept. 21-23, 1994. 347-57.

Johnson, Kemblowski, and Colthart 1988

Johnson, P. C., Kemblowski, M. W., and Colthart, J. D. 1988. Practical screening models for soil venting applications. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Dublin, OH. NWWA/API.

Johnson, Kemblowski, and Colthart 1990b

Johnson, P. C., Kemblowski, M. W., and Colthart, J. D. 1990b. Quantitative analysis for the cleanup of hydrocarbon-contaminated soils by in-situ venting. *Groundwater*. 28(3):413-29.

Johnson, Palmer, and Keely 1987

Johnson, R. L., Palmer, C. D., and Keely, J. F. 1987. Mass transfer of organics between soil, water and vapor phases: implications for monitoring, biodegradation and remediation. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. November 1987. NWWA/API, Dublin, OH. pp. 473-507.

Johnson et al 1999

Johnson, Jeffrey, DeWitt, Christopher B., Wolfe, Bryan, and Mark Garman. 1999. *Moisture and Ammonia-Enhanced Bioventing in Arid Environments*, abstract, in "Proceedings of the Fifth International Symposium on In-Situ and On-Site Bioremediation, San Diego, CA, April 19-22, 1999"

Jones, Gee, and Heller 1980

Jones, T. L., Gee, G. W., and Heller, P. R. 1980. Psychrometric measurement of soil water potential: stability of calibration and test of pressure-plate samples. *Soil Science*. 150:531-41.

Joss 1993

Joss, C. J. 1993. *Multispecies Vapor Transport and Reactions in Porous Media Under Conditions of Induced Air Flow*. Ph.D. Dissertation, Drexel University, Philadelphia, PA.

Joss and Baehr 1995

Joss, C.J., and Baehr, A.L. 1995. *Documentation of AIR3D: An adaptation of the ground-water-flow code MODFLOW to simulate three-dimensional airflow in the unsaturated zone*. U.S. Geological Survey Open-File Report 94-533.

Joss and Baehr 1997

Joss, C.J., and Baehr, A.L. 1997. *AIR2D: A computer program to simulate two-dimensional radially symmetric airflow in the unsaturated zone*. U.S. Geological Survey Open File Report 97-588, 106p.

Jury et al. 1987

Jury, W. A., Winer, A. M., Spencer, W. F., and Focht, D. D. 1987. Transport and transformations of organic chemicals in the soil-air-water ecosystem. *Reviews of Environmental Contamination and Toxicology*. 99:120-64.

Jury et al. 1990

Jury, W. A., Russo, D., Streile, G., and El Abd, H. 1990. Evaluation of volatilization by organic chemicals residing below the soil surface. *Water Resources Research*. 26:13-20.

Kaleris and Croise 1999

Kaleris, V., and Croise, J. 1999. Estimation of Cleanup Time in Layered Soils by Vapor Extraction. *Journal of Contaminant Hydrology*. 36:105-129.

Kampbell and Newell 1990

Kampbell, D. H., and Newell, B. 1990. Microbial activity of aliphatic hydrocarbon utilizers in the presence of sulfur hexafluoride or trichloroethylene vapors. Poster presentation: *Robert S. Kerr Environmental Research Laboratory Ground-Water Seminar*. Oklahoma City, OK.

Kampbell and Wilson 1991

Kampbell, D. H., and Wilson, J. T. 1991. Bioventing to treat fuel spills from underground storage tanks. *Journal of Hazardous Materials*. 28:75-80.

King 1968

King, L. G. 1968. *Mathematical Models for Underground Injection of Gaseous Wastes into the Vadose Zone*. Battelle Technical Report No. BNRL-945. Battelle Pacific Northwest Laboratory, Richland, WA. 146 pp.

Kittel et al. 1994

Kittel, J. A., Hinchee, R. E., Hoeppel, R., and Miller, R. 1994. Bioslurping - vacuum-enhanced free-product recovery coupled with bioventing: a case study. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. November 2-4, 1994. NGWA/API, Dublin, OH. 15 pp.

Klinkenberg 1941

Klinkenberg, L. J. 1941. The permeability of porous media to liquids and gases. *American Petroleum Institute Drilling and Production - Practice*. pp. 200-13.

Klute 1986

Klute, A. 1986. Water retention: laboratory methods. In: Klute, A. (ed.). *Methods of Soil Analysis, Part 1 - Physical and Mineralogical Methods*. Agronomy Monograph No. 9 (2nd Ed.). American Society of Agronomy-Soil Science Society of America, Madison, WI. pp. 635-62.

Klute and Dirksen 1986

Klute, A., and Dirksen, C. 1986. Hydraulic conductivity and diffusivity: laboratory methods. In: Klute, A. (ed.). *Methods of Soil Analysis, Part 1 - Physical and Mineralogical Methods*. Agronomy Monograph No. 9 (2nd ed.). American Society of Agronomy-Soil Science Society of America, Madison, WI. pp. 687-734.

Kosky and Neff 1988

Kosky, K. F., and Neff, C. R. 1988. Innovative biological degradation system for hydrocarbons treatment. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. November 1988. NWWA, Dublin, OH.

Kramer, Cullen, and Everett 1992

Kramer, J. H., Cullen, S. J., and Everett, L. G. 1992. Vadose zone monitoring with the neutron moisture probe. *Ground Water Monitoring Review*. 12:3:177-87.

Kress et al. 1992

Kress, M. F., Corbin, M. H., Metzer, N. A., and Hoothoofd, J. M. 1992. Field investigation of effectiveness of soil vapor extraction technology. *Proceedings: In Situ Treatment of Contaminated Soil and Water International Symposium*. February 4-6, 1992, Cincinnati, OH. USEPA and Air and Waste Management Association. Pittsburgh, PA. pp. 169-77.

Lewis 1993

Lewis, N. 1993. Soil vapor extraction technologies. In: *Demonstration of Remedial Action Technologies for Contaminated Land and Groundwater, Final Report, Volume I*. North Atlantic Treaty Organization. EPA/600/R-93/012a. Available at National Technical Information Service, Springfield, VA. pp. 33-52.

Lewis et al. 1991

Lewis, T. E., Crockett, A. B., Siegrist, R. L., and Zarrabi, K. 1991. *Soil Sampling and Analysis for Volatile Organic Compounds*. Ground-Water Issue. EPA/540/4-91/001. U.S. Environmental Protection Agency, Office of Research and Development, Office of Solid Waste and Emergency Response.

Lighty et al. 1988

Lighty, J. S., Silcox, G. D., Pershing, D. W., and Cundy, V. A. 1988. On the fundamentals of thermal treatment for the cleanup of contaminated soils. *Proceedings: Air Pollution Control Association 81st Annual Meeting*. Dallas, TX. June 19-24, 1988.

Lohman 1972

Lohman, S. W. 1972. *Ground-Water Hydraulics*. U.S. Geological Survey Professional Paper 708. 70 pp.

Lyman, Rechl, and Rosenblatt 1982

Lyman, W. J., Rechl, W. F., and Rosenblatt, D. H. 1982. *Handbook of Chemical Property Estimation Methods*. McGraw-Hill, Inc., New York.

Mabrey et al. 1982

Mabrey, W. R., Smith, J. H., Podoll, H. I., Johnson, T. Mill, Chou, T-W., Gates, J., Partridge, I. W., Jaber, H., and Vanderberg, D. 1982. *Aquatic Fate Process Data for Organic Priority Pollutants*. EPA Report No. 440/4-81-014.

Mackay and Shiu 1981

Mackay, D., and Shiu, W. Y. 1981. A critical review of Henry's Law constants for chemicals of environmental interest. *Journal of Physical and Chemical Reference Data*. 10:1175-99.

Marley 1992

Marley, M. C. 1992. Removing gasoline from soil and groundwater through air sparging. *Remediation*. Spring 1992. pp. 121-31.

Marley 1993

Marley, M. C. 1993. Evaluation of vadose zone air flow pathways utilizing tracer gases and the subsequent implications on vapor extraction system design. In: Calabrese, E. J., and Kostecki, P. T. (eds.). *Hydrocarbon Contaminated Soils. Volume III*. Lewis Publishers, Chelsea, MI. pp. 379-401.

Marley and Hoag 1984

Marley, M. C., and Hoag, G. E. 1984. Induced soil venting for recovery/restoration of gasoline hydrocarbons in the vadose zone. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. NWWA/API, Dublin, OH. pp 473-503.

Marley et al. 1990a

Marley, M. C., Nangeroni, P. E., Cliff, B. L., and Polonsky, J. D. 1990a. Air flow modeling for in-situ extraction system design. *Proceedings: Fourth National Outdoor Action Conference*. NWWA, Dublin, OH. pp. 651-65.

Marley et al. 1990b

Marley, M. C., Richter, S. D., Cody, R. J., and Cliff, B. L. 1990b. Modeling for in-situ evaluation of soil properties and engineered vapor extraction system design. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. October 31 - November 2, 1990. NWWA/API, Dublin, OH. 14 pp.

Mason 1983

Mason, B. J. 1983. *Preparation of Soil Sampling Protocol: Techniques and Strategies*. EPA-600/4-83-020 (NTIS No. PB83-206979).

Massachusetts Department of Environmental Protection (MADEP) 1993

Massachusetts Department of Environmental Protection (MADEP). 1993. *Draft Policy on Off-Gas Treatment of Point-Source Remedial Air Emissions Pursuant to MFL C. 21E*.

Massmann and Farrier 1992

Massmann, J., and D.F. Farrier. 1992. Effects of atmospheric pressures on gas transport in the vadose zone. *Water Resour. Res.* 28:777-791.

McWhorter 1971

McWhorter, D. B. 1971. Infiltration affected by flow of air. *Hydrology Paper No. 49*. Colorado State University, Fort Collins, CO.

McWhorter 1990

McWhorter, D. B. 1990. Unsteady radial flow of gas in the vadose zone. *Journal of Contaminant Hydrology*. 5:297-314.

McWhorter and Sunada 1977

McWhorter, D. B., and Sunada, D. K. 1977. *Groundwater Hydrology and Hydraulics*. Water Resources Publications, Littleton, CO. 256 pp.

Merck and Co., Inc. 1989

Merck and Co., Inc. 1989. *The Merck Index*. Rahway, NJ.

Miller 1975

Miller, C. A. 1975. Stability of moving surfaces in fluid systems with heat and mass transport, III. Stability of displacement fronts in porous media. *American Institute of Chemical Engineering Journal*. 21(3):474-9.

Miller 1990

Miller, R. N. 1990. *A Field Scale Investigation of Enhanced Petroleum Hydrocarbon Degradation in the Vadose Zone Combining Soil Venting as an Oxygen Source with Moisture and Nutrient Addition*, Ph.D. Dissertation. Utah State University, Logan, UT.

Miller et al 1991

Miller, R.N., Vogel, C.M., and Hinchee, R.E. 1991. A field-scale investigation of petroleum hydrocarbon biodegradation in the vadose zone enhanced by soil venting at Tyndall AFB, Florida. pp. 283-302. In: Hinchee, R.E., and Olfenbuttel, R.F. (eds.) *In Situ Bioreclamation*. Butterworth-Heinemann, Boston, MA.

Miller et al. 1993

Miller, R. N., Downey, D. C., Carmen, V. A., Hinchee, R. E., and Leeson, A. 1993. A summary of bioventing performance at multiple Air Force sites. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. November 10-12, 1993. NGWA/API, Dublin, OH. pp. 397-411.

Moench 1989

Moench, A. F. 1989. Convergent radial dispersion: a LaPlace transform solution for aquifer tracer testing. *Water Resources Research*. 25(3):439-47.

Moench 1991

Moench, A. F. 1991. Convergent radial dispersion: a note on evaluation of the LaPlace transform solution. *Water Resources Research*. 27(12):3261-4.

Molz et al 1989

Molz, F.J., Morin, R.H., Hess, A.E., Melville, J.G., and Guven, O. 1989. The impeller meter for measuring aquifer permeability variations: Evaluation and comparison with other tests. *Water Resour. Res.* 25(7):1677-1683.

Mortimer 1986

Mortimer, C.E. 1986. *Chemistry*. Sixth Edition. Wadsworth Publishing Co., Belmont, CA.

Moyer 1993

Moyer, E. E. 1993. *Investigation of Diffusion and Biodegradation of Vapor Phase Petroleum Hydrocarbons*. Ph.D. Dissertation. University of Massachusetts, Amherst, MA. 238 pp.

Mualem 1976

Mualem, Y. 1976. A new model for predicting the hydraulic conductivity of unsaturated porous media. *Water Resources Research*. 12:513-22.

Mualem 1986

Mualem, Y. 1986. Hydraulic conductivity of unsaturated soil: prediction and formulas. In: Klute, A. (ed.). *Methods of Soil Analysis, Part 1 - Physical and Mineralogical Methods*. Monograph No. 9 (2nd Ed.). American Society of Agronomy - Soil Science Society of America. Madison, WI. pp. 799-823.

Muskat and Botset 1931

Muskat, M., and Botset, H. G. 1931. Flow of gas through porous materials. *Physics*. 1:27-47.

National Fire Protection Association (NFPA) 1991a

National Fire Protection Association (NFPA). 1991a. *Recommended Practice for the Classification of Class II Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.* NFPA Document No. 497B, Item No. MA-497B-91. Rev. 1991.

NFPA 1991b

NFPA. 1991b. *Classification of Gases, Vapors and Dusts for Electrical Equipment in Hazardous (Classified) Locations.* NFPA Document No. 497M, Item No. MA-497M-91. Rev. 1991.

NFPA 1994

NFPA. 1994. *Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids.* Publication No. 325, Quincy, MA.

National Institute for Occupational Safety and Health (NIOSH) 1984

National Institute for Occupational Safety and Health (NIOSH). 1984. *Manual of Analytical Methods.* 3rd Ed.

New Jersey Department of Environmental Protection and Energy (NJDEPE) 1992

New Jersey Department of Environmental Protection and Energy (NJDEPE). 1992. *Field Sampling Procedures Manual.* Available from the Maps and Publications Sales Office, Bureau of Revenue, CN 417, Trenton, NJ 08625. (609) 777-1038.

Neuman 1975

Neuman, S.P. 1975. Ananlysis of pumping test data from anisotropic unconfined aquifers considering delayed gravity response. *Water Resources Res.* 11. pp. 329-342.

Newmark and Aines, 1995

Newmark, R.L., and R.D. Aines, 1995. *Summary of the LLNL Gasoline Spill Demonstration Dynamic Underground Stripping Project,* Livermore National Laboratory, Berkeley Environmental Restoration Center, UCRL-ID-120416, April 3, 1995

Ng and Mei. 1996

Ng, C.-O., and Mei, C.C. 1996. Aggregate diffusion model applied to soil vapor extraction in unidirectional and radial flows. *Water Resour. Res.* 32(5):1289-1297.

Novak, Young, and Forsling 1993

Novak, J. T., Young, R. G., and Forsling, S. 1993. Bioavailability of contaminants sorbed to soil organic matter. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water.* Houston, TX. November 10-12, 1993. NGWA/API, Dublin, OH. pp. 335-49.

Nyer et al. 1994

Nyer, E.K, Macneal, R.W., and Schafer, D.C. 1994. VES design: Using simple or sophisticated design methods. *Ground Water Monitoring and Remediation.* Summer:101-104.

Ong et al. 1991

Ong, S. K., Hinchee, R. E., Hoeppel, R., and Schultz, R. 1991. In situ respirometry for determining aerobic degradation rates. In: Hinchee, R. E., and Olfenbuttel, R. F. (eds.) *In Situ Bioreclamation*. Butterworth-Heinemann, Boston, MA. pp. 541-5.

Ostendorf and Campbell 1989

Ostendorf, D. W., and Campbell, D. H. 1989. Vertical profiles and near surface traps for field measurement of volatile pollution in the subsurface environment. *Proceedings: NWWA Conference on New Techniques for Quantifying the Physical and Chemical Properties of Heterogeneous Aquifers*. Dallas, TX. NWWA, Dublin, OH.

Ostendorf and Campbell 1990

Ostendorf, D. W., and Campbell, D. H. 1990. Bioremediated soil venting of light hydrocarbons. *Hazardous Waste and Hazardous Materials*. 7:4:319-34.

Ostendorf and Campbell 1991

Ostendorf, D. W., and Campbell, D. H. 1991. Biodegradation of hydrocarbon vapors in the unsaturated zone. *Water Resources Research*. 27:453-62.

Ostendorf et al. 1993a

Ostendorf, D. W., Moyer, E. E., Xie, Y., and Rajan, R. V. 1993a. Hydrocarbon vapor diffusion in intact core sleeves. *Ground Water Monitoring and Remediation*. 13:139-50.

Ostendorf, Moyer, and Hinlein 1993b

Ostendorf, D. W., Moyer, E. E., and Hinlein, E. S. 1993b. Petroleum hydrocarbon sparging from intact core sleeve samples. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. November 10-12, 1993. NGWA/API, Dublin, OH. pp. 415-27.

Oster and Wenck 1988

Oster, C. C., and Wenck, N. C. 1988. Vacuum extraction of volatile organics from soils. *Proceedings: 1988 Joint CSCE-ASCE National Conference on Environmental Engineering*. Vancouver, BC. July 13-15, 1988. pp. 809-17.

Page et at. 1982

Page A. L. (ed.). 1982. *Methods of Soil Analysis. Part 2. Chemical and Microbiological Properties. 2nd Edition*. 9(2):199-224. American Society of Agronomy. Madison, WI.

Paillet 1998

Paillet, F.L. 1998. Flow modeling and permeability estimation using borehole flow logs in heterogeneous fractured formations. *Water Resour. Res.* 34(5):997-1010.

Pankow, Johnson, and Cherry 1993

Pankow, J. F., Johnson, R. L., and Cherry, J. A. 1993. Air sparging in gate wells in cutoff walls and trenches for control of plumes of volatile VOCs. *Groundwater*. 31(4):654-63.

Payne 1993

Payne, F. 1993. Release rate barriers in soil vapor extraction. *Eighth Annual Conference on Contaminated Soils*. School of Public Health, University of Massachusetts. Amherst, MA. September 20-23, 1993.

Peargin and Mohr 1994

Peargin, T. R., and Mohr, D. H. 1994. Field criteria for SVE pilot tests to evaluate data quality and estimate remediation feasibility. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. November 2-4, 1994. NGWA/API, Dublin, OH. 14 pp.

Perry and Green 1984

Perry, R. H., and Green, D. 1984. *Perry's Chemical Engineers' Handbook*, 6th Ed. McGraw-Hill Publishing Co., Inc., New York. pp. 20.83-88.

Pignatello 1989

Pignatello, J. J. 1989. Sorption dynamics of organic compounds in soils and sediments. In: Sawhney, B. L., and Brown, K. (eds.). *Reactions and Movements of Organic Chemicals in Soils*. Soil Science Society of America and American Society of Agronomy, Madison, WI. pp. 45-80.

PPI 1974

Plastic Pipe Institute (PPI). 1974. Thermal Expansion and Contraction of Plastic Pipe. PPI AW-32 TR21

Praxis 1999

Praxis Environmental Technologies. 1999. *Quality Program Plan, Final, Demonstration of Improved Soil Vapor Extraction: Characterization Progressing to Remediation at Beale, Nellis, and Griffiss Air Force Installations*. January 1999. Praxis Environmental Technologies, Burlingame, CA.

Quigley 1995

Quigley, D.W. 1995. Personal Communication. HLA-Envirosciences Pty Limited, Sydney, Australia.

Rabideau and Blayden 1998

Rabideau, A.J., and Blayden, J.M. 1998. Analytical Modeling for Contaminant Mass Removal by Air Sparging. *Ground Water Monitoring Review*. XVIII(4):120-130.

Rafson 1998

Rafson, H.J. 1998. Odor and VOC Control Handbook. McGraw Hill. New York, NY.

Rathfelder, Yeh, and Mackay 1991

Rathfelder, K., Yeh, W. W. G., and Mackay, D. 1991. Mathematical simulation of soil vapor extraction systems: model development and numerical examples. *Journal of Contaminant Hydrology*. 8:263-97.

Reisinger, Johnstone, and Hubbard, Jr. 1994

Reisinger, H. J., Johnstone, E. F., and Hubbard, P., Jr. 1994. Cost effectiveness and feasibility comparison of bioventing versus conventional soil venting. In: Hinchee, R. E., Alleman, B. C., Hoeppel, R. E., and Miller, R. N. (eds.). *Hydrocarbon Bioremediation*. Lewis Publishers, Boca Raton, FL. pp. 40-57.

Richards, Ostendorf, and Switzenbaum 1992

Richards, R. J., Ostendorf, D. W., and Switzenbaum, M. S. 1992. Aerobic soil microcosms for long-term biodegradation of hydrocarbon vapors. *Hazardous Waste and Hazardous Materials*. 9:4:397-410.

Rodriguez-Maroto, Gomez-Lahoz, and Wilson 1992

Rodriguez-Maroto, J. M., Gomez-Lahoz, C., and Wilson, D. J. 1992. VOC cleanup by in situ soil vapor extraction - some recent developments in modeling. *Proceedings: Symposium on Soil Venting*. EPA/600/2-92/174. Houston, TX. April 29-May 1, 1991.

Rossabi et al 1999

Rossabi, Joseph, Brian D. Riha, Robert S. Vanpelt, Tom Kmetz, and Bradley E. Pmeberton. 1999. "Passive Soil Vapor Extraction for Intermin Remediation at the Savannah River Site," in Wickramanayake, Godage B, and Robert E. Hinchee, eds, Proceedings, First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 18-21, 1998, Volume 5, pp.161-168, Battelle Press, Columbus, Ohio.

RZA AGRA, Inc. 1993

RZA AGRA, Inc. 1993. Removal of gasoline volatile organic compounds via air biofiltration: a technique for treating secondary air emissions from vapor-extraction and air-stripping systems. *Proceedings: Second Annual International Symposium on In Situ and On-Site Bioreclamation*. San Diego, CA. April 4-9, 1993. 18 pp.

Saxton et al., 1986

Saxton, K. E., W.J. Rawls, J.S. Romberger, and R. I. Papendick , 1986 Estimating generalized soil-water characteristics from texture. *Soil Sci. Soc. Amer. J.* 50(4):1031-1036

Sayles et al. 1992

Sayles, G. D., Hinchee, R. E., Brenner, R. C., Vogel, C. M., and Miller, R. N. 1992. In-situ bioventing: two USEPA and Air Force sponsored field studies. *Proceedings: USEPA/Air and Waste Management Association Sponsored International Symposium: In-Situ Treatment of Contaminated Soil and Water*. Cincinnati, OH. February 3-6, 1992. 10 pp.

Schroeder et al. 1992

Schroeder, J. D., Rosenberg, N. D., Barnes-Smith, E. P., and Booth, S. R. 1992. *In Situ Air Stripping: Cost Effectiveness of a Remediation Technology Field Tested at the Savannah River Integrated Demonstration Site*. Los Alamos National Laboratory, Los Alamos, NM. 52 pp.

Scow, Simkins, and Alexander 1986

Scow, K. M., Simkins, S., and Alexander, M. 1986. Kinetics of mineralization of organic compounds at low concentrations in soil. *Applied and Environmental Microbiology*. 51:1028-35.

Severin, Shi, and Hayes 1994

Severin, B. F., Shi, J., and Hayes, T. 1994. Destruction of gas industry VOCs in a biofilter. *Proceedings: IGT Symposium on Gas, Oil, and Environmental Technology.* Colorado Springs, CO. November 29-December 3, 1993. Institute of Gas Technology, Chicago, IL.

Siegrist and Jenssen 1990

Siegrist, R. L., and Jenssen, P. D. 1990. Evaluation of sampling method effects on volatile organic compound measurements in contaminated soils. *Environmental Science and Technology.* 24(9): 1387-92.

Sittler and Swinford 1993

Sittler, S., and Swinford, G. 1993. Thermal-enhanced soil vapor extraction accelerates cleanup of diesel-affected soil. *The National Environmental Journal.* January/February. pp. 40-3.

Sleep and Sykes 1989

Sleep, B. E., and Sykes, J. F. 1989. Modeling the transport of volatile organics in variably saturated media. *Water Resources Research.* 25(1):81-92.

Smith, Adams, and Basile 1994

Smith, G. J., Adams, T.V., and Basile, A. J. 1994. Evaluating DNAPL removal in a low-permeability porous media using the Simpler process. *Proceedings of the Seventh Annual Environ. Mgmt. and Tech. Conf. Central,* April 12-14, 1994, Rosemont, IL, HazMat Central.

Smith et al. 1995

Smith, J. R., Tomicek, R. M., Swallow, P. V., Weightman, R. L., Nakles, D. V., and Helbing, M. 1995. Definition of biodegradation endpoints for PAH contaminated soils using a risk-based approach. In: Kostecki, P. T., and Calabrese, E. J. (eds.) *Proc. Ninth Annual Conference on Contaminated Soils.* Oct. 18-20, 1994. Univ. of Massachusetts. Amherst Scientific Publishers, Amherst, MA.

Sorensen and Sims 1992

Sorensen, D. L., and Sims, R. C. 1992. Habitat conditions affecting bioventing processes. *Proceedings: Symposium on Soil Venting.* EPA/600/2-92/174. Houston, TX. April 29-May 1, 1991. pp. 55-69.

Spencer Turbine Company 1987

Spencer Turbine Company. 1987. *Spencer Turbo Compressors: Technical Data.* Bulletin 127, Windsor, CT.

Sresty, Der, and Houthoofd 1992

Sresty, G., Der, H., and Houthoofd, J. 1992. In situ soil decontamination by radio frequency heating. *Proceedings: International Symposium on In Situ Treatment of Contaminated Soil and Water.* Cincinnati, OH. February 3-6, 1992. Air and Waste Management Association, pp. 356-69.

Stephen and Stephen 1963

Stephen, H., and Stephen, T. 1963. *Solubilities of Inorganic Compounds.* MacMillan, New York.

Stegemeier and Vinegar, 2000

Stegemeier, G.L. and H.J. Vinegar, 2000, Thermal Conduction Heating for In-Situ Thermal Desorption of Soils, CRC Press, Boca Raton, FL, in press.

Stewart et al., 1998

Stewart, L.D., Ginn, J., and Hicken, S. Field Demonstration of Thermally Enhanced Extraction for DNAPL Source Removal, in Wickramanayake, G.B., and R.E. Hinchee (eds.), Non-Aqueous Phase Liquids: Remediation of Chlorinated and Recalcitrant Compounds. Battelle Press, Columbus, OH, 255 p

Stransky and Blanchard 1989

Stransky, R., and Blanchard, M. S. 1989. An in-situ venting program for petroleum hydrocarbons in soil and water. *Proceedings: Third National Outdoor Action Conference*. NWWA, Dublin, OH. pp. 607-21.

Stull 1947

Stull, D. R. 1947. Vapor pressures of pure substances: organic compounds. *Industrial Engineering Chemistry*. 39:517-19.

Texas Research Institute 1980

Texas Research Institute. 1980. *Laboratory Scale Gasoline Spill and Venting Experiment*. American Petroleum Institute, Interim Report No. 7743-5:JST, Washington, DC.

Texas Research Institute 1984

Texas Research Institute. 1984. *Forced Venting to Remove Gasoline Vapor from a Large-Scale Model Aquifer*. American Petroleum Institute, Final Report No. 82101-F:TAV. Washington, DC.

Theis 1935

Theis, C. V. 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge to a well using groundwater storage. *Transactions American Geophysical Union*. 2:519-24.

Thornton and Wootan 1982

Thornton, S. J., and Wootan, W. L. 1982. Venting for the removal of hydrocarbon vapors from gasoline contaminated soils. *Journal of Environmental Science and Health*. A17(1):13-44.

Travis and Macinnis 1992

Travis, C., and Macinnis, J. 1992. Vapor extraction of organics from subsurface soils: is it effective? *Environmental Science and Technology*. 26(10):1885-87.

Udell, 1996

Udell, K.S. 1996. *Heat and Mass Transfer in Clean-Up of Underground Toxic Wastes, Advances in Heat Transfer Research*, C-L. Tien (ed.) Begell House, Inc., New York.

Urban 1992

Urban, D. B. 1992. Case study: the effect of groundwater contamination on soil remediation with soil vapor extraction. *Water Environmental Federation 65th Annual Conference and Exposition*. New Orleans, LA. September 20-24, 1992.

U.S. District Court 1994

U.S. District Court. 1994. Court Order issued 12 May, 1994 in the case of James J. Malot versus Roy F. Weston, Inc. and Weston Services, Inc. Civil Action No. 1:92-CV-628-RLV. United States District Court for the Northern District of Georgia, Atlanta Division. 15 pp.

U.S. Environmental Protection Agency (USEPA) 1975

USEPA. 1975. Manual of Water Well Construction Practices. EPA/570/9-75/001.

USACE 1998

USACE. 1998. Interim Chemical Data Quality Management (CDQM) Policy for USACE Hazardous, Toxic and Radioactive Waste (HTRW) Projects. CEMP-RT (200-1a).

USEPA 1987b

USEPA. 1987b. *Compendium of Methods for the Determination of Toxic Compounds in Ambient Air*. EPA/600/4-84-041.

USEPA 1988a

USEPA. 1988a. *Cleanup of Releases from Petroleum USTs: Selected Technologies*. EPA/530/UST-88/001. Office of Underground Storage Tanks, Washington, DC.

USEPA 1988b

USEPA. 1988b. *Field Screening Methods Catalog*. EPA/540/2-88/005.

USEPA 1988c

USEPA. 1988c. *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*. EPA/540/G-89/004.

USEPA 1989b

USEPA. 1989b. *Soil Sampling Quality Assurance User's Guide*. 2nd Ed. EPA/600/8-89/046 (NTIS No. PB89-189864).

USEPA 1989c

USEPA. 1989c. *Laboratory Investigation of Residual Liquid Organics from Spills, Leaks, and the Disposal of Hazardous Wastes in Groundwater*. EPA/600/6-90/004. New Mexico Institute of Mining and Technology, Socorro, NM.

USEPA 1989d

USEPA. 1989d. *Estimating Air Emissions From Petroleum UST Cleanups.* Office of Underground Storage Tanks. Washington, DC.

USEPA 1989e

USEPA. 1989e. *Methods for Evaluating the Attainment of Cleanup Standards; Volume I, Soils and Solid Media.* EPA 230/2-89/042.

USEPA 1990a

USEPA. 1990a. *Contract Laboratory Program. Statement of Work for Analysis of Ambient Air (Draft).* June 1990.

USEPA 1990b

USEPA. 1990b. *Assessing UST Corrective Action Technologies: Site Assessment and Selection of Unsaturated Zone Treatment Technologies.* EPA/600/2-90/011.

USEPA 1991a

USEPA. 1991a. *Accessing Federal Data Bases for Contaminated Site Clean-up Technologies.* EPA/540/8-91/009. Prepared by the Member Agencies of the Federal Remediation Technologies Roundtable.

USEPA 1991b

USEPA. 1991b. *Compendium of ERT Soil Sampling and Surface Geophysics Procedures.* OSWER Directive 9360.4-02 (NTIS No. PB91-9211273).

USEPA 1991e

USEPA. 1991e. *Proceedings: Symposium on Soil Venting.* EPA/600/R-92/174. Houston, TX. April 29-May 1, 1991. Office of Research and Development. 334 pp.

USEPA 1991f

USEPA. 1991f. *Environmental Compliance Branch, Standard Operation Procedures and Quality Assurance Manual.* NTIS No. PB91-233650. Rev. 1.

USEPA 1991g

USEPA. 1991g. *Soil Sampling and Analysis for Volatile Organic Compounds.* EPA/540/4-91/001.

USEPA 1991h

USEPA. 1991h. *Description and Sampling of Contaminated Soils, A Field Pocket Guide.* EPA 625/12-91/002, Center for Environmental Research Information, Cincinnati, OH.

USEPA 1993a

USEPA. 1993a. *Cleaning Up the Nation's Waste Sites: Markets and Technology Trends.* EPA/542/F-93/003. Fact Sheet and Order Form. Office of Solid Waste and Emergency Response (05-110W), Washington, DC.

USEPA 1993b

USEPA. 1993b. *Innovative Treatment Technologies: Annual Status Report*. EPA/542/R-93/003. Office of Solid Waste and Emergency Response (5102W), Washington, DC.

USEPA 1993c

USEPA. 1993c. *Decision-Support Software for Soil Vapor Extraction Technology Application: HyperVentilate*. EPA/600/SR-93/028. Office of Research and Development.

USEPA 1993e

USEPA. 1993e. *Hydraulic Fracturing Technology, Technology Demonstration Summary*. EPA/540/SR-93/505.

USEPA 1993f

USEPA. 1993f. *Data Quality Objectives Process for Superfund. Interim Final Guidance*. EPA/540/G-93/071.

USEPA 1993g

USEPA. 1993g. *Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration*. Interim Final. Directive 9234.2-25, September 1993. OSWER. Washington, DC. 26 pp.

USEPA 1994

USEPA. 1994. *Innovative Treatment Technologies: Annual Status Report (Sixth Edition)*, EPA 542-R-94-005, Office of Solid Waste and Emergency Response, Washington, D.C.

USEPA 1995c

USEPA. 1995c. *QAQPS Control Cost Manual, Chapter 3 – Thermal and Catalytic Incinerators*, EPA-453/B-96-001.

USEPA 1997c

USEPA. 1997. *Locating and Estimating Air Emissions from Sources of Dioxins and Furans*, EPA-454/R-97-003.

USEPA 1999

USEPA. 1999. *Treatment Technologies for Site Cleanup: Annual Status Report (Ninth Edition)*. EPA-542-R99-001. Office of Solid Waste and Emergency Response, Washington, D.C.

U.S. Geological Survey 1987

U.S. Geological Survey. 1987. *Basic Groundwater Hydrology*. U.S. Government Printing Office. Water Supply Paper 2220.

van Eyk and Vreeken 1988

van Eyk, J., and Vreeken, C. 1988. Venting-mediated removal of hydrocarbons from subsurface soil-strata as a result of simulated evaporation and enhanced biodegradation. *Med. Fac. Landbouww. Rijksuniv. Gent* 53(4b):1873-1884.

von Fahnestock, F.M., et al., 1996

von Fahnestock, F.M., Smith, L.A., Wickramanayake, G.B. Place, M.C., Kratzke, R.J., Major, W.R., Walker, A.M., Wollenberg, J.P., Carsley, M.J., Dinh, P.V., and Ta, N.T. 1996. Biopile Design and Construction Manual, Naval Facilities Engineering Service Center Technical Memorandum, Port Hueneme, CA, TM-2189-ENV

Van Genuchten 1980

Van Genuchten, M. T. 1980. A closed-form equation for predicting the hydraulic conductivity of unsaturated soils. *Soil Science Society of America Journal*. 44:892-8.

Verschueren 1983

Verschueren, K. 1983. *Handbook of Environmental Data on Organic Chemicals*. 2nd Ed. Van Nostrand-Reinhold, New York.

Vinegar et al., 1998

Vinegar, H.J., de Rouffignac, E.P., Stegemeier, G.L., Hirsch, J.M., and Carl, F.G., In-situ Thermal Desorption Using Thermal Wells and Blankets, in Wickramanayake, G.B., and R.E. Hinchee (eds.), Physical, Chemical, and Thermal Technologies: Remediation of Chlorinated and Recalcitrant Compounds. Battelle Press, Columbus, OH, 511 p

Wackett et al. 1989

Wackett, L. P., Brusseau, G. A., Householder, S. R., and Hanson, R. S. 1989. Survey of microbial oxygenases: trichloroethylene degradation by propane-oxidizing bacteria. *Applied and Environmental Microbiology*. 55:2960-4.

Wilkins et al. 1995

Wilkins, M.D., Abriola, L.M., and Pennell, K.D. 1995. An experimental investigation of rate-limited nonaqueous phase liquid volatilization in unsaturated porous media: Steady state mass transfer, *Water Resour. Res.* 31(9):2159-2172

Williams et al. 2000

Williams, G.P , Tomasko, D., Jiang,Z. and May, I. 2000. Long-Term Monitoring for SVE Exit Strategies. Presented at the Second Battelle Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 2000.

Wilson and Ward 1986

Wilson, J. T., and Ward, C. H. 1986. Opportunities for bioremediation of aquifers contaminated with petroleum hydrocarbons. *Journal of Industrial Microbiology*. 27:109-16.

Wilson and Wilson 1985

Wilson, J. T., and Wilson, B. H. 1985. Biotransformation of trichloroethylene in soil. *Applied and Environmental Microbiology*. 49:242-3.

Wilson, Clarke, and Clarke 1988

Wilson, D. J., Clarke, A. N., and Clarke, J. H. 1988. Soil clean up by in-situ aeration. I. mathematical modeling. *Separation Science and Technology*. 23:991-1037.

World Health Organization, International Agency for Research on Cancer 1989

World Health Organization, International Agency for Research on Cancer. 1989. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans - Occupational Exposures in Petroleum Refining; Crude Oil and Major Petroleum Fuels - Volume 45*. Lyon, France. 285 pp.

Young 1995

Young, S.C. 1995. Characterization of high-k pathways by borehole flowmeter and tracer tests. *Ground Water*. 33(2):311-318.

Zachary and Everett 1993

Zachary, S. P., and Everett, L. G. 1993. In situ active/pассив bioreclamation of vadose zone soils contaminated with gasoline and waste oil using soil vapor extraction/bioventing: laboratory pilot study to full scale site operation. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Houston, TX. November 10-12, 1993. NGWA, Dublin, OH. pp. 509-21.